Efficient Generation of Astrocytes From Human Pluripotent Stem Cells in Defined Conditions.

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Public Summary:
Astrocytes can be generated from various tissue sources including human pluripotent stem cells (PSC). In this manuscript, we describe a chemically defined xeno-free medium culture system for rapidly generating astrocytes from neural stem cells (NSC) derived from PSC. We show that astrocyte development in vitro, mimics normal development in vivo, and also passes through a CD44+ astrocyte precursor stage. Astrocytes generated by our method display similar gene expression patterns, morphological characteristics and functional properties to primary astrocytes, and they survive and integrate after xenotransplantation. Whole genome expression profiling of astrocyte differentiation was performed at several time points of differentiation, and the results indicate the importance of known regulators, and identify potential novel regulators and stage specific lineage markers.

Scientific Abstract:
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